

Transit Signal Priority (TSP)

Econolite's Transit Signal Priority software provides an effective means of improving transit system performance with minimal overall impact on system coordination. The TSP algorithm continually monitors for a priority input and evaluates the coordination plan to determine the best way to cycle the controller for maximum results.



Objectives

- Reduce transit vehicle delays without causing unnecessary disruptions to signal system coordination
- Improve public transit schedule consistency to increase ridership
- Minimize the effects of transit operation on system coordination

Software Benefits

- TSP software maintains proper coordination, while servicing the transit vehicle, without interruption to the active coordination plan
- Only one TSP vehicle is permitted each cycle
- User has the option to allow phases to be skipped or to prevent phases from being skipped
- Splits are modified during TSP to accommodate detected transit vehicles
- TSP events are logged in the controller for engineering and transit authority analysis
- When using an intelligent transit vehicle emitter, TSP will only be activated when the vehicle is behind schedule

Software/Controller Options

- Econolite's TSP software is currently available in all of the following controllers:
 - ASC/2 Series NEMA controllers
 - ASC/2070 software for 2070L controllers
 - ASC/3 Series NEMA controllers
 - 2070 Controllers running Econolite ASC/3/2070 software

Transit Benefits/Results

- Studies have proven that TSP can reduce intersection delay for transit vehicles by 20-40%
- Reduction of total travel time of up to 8% has been shown when using TSP
- TSP improves serviceability and schedule reliability
- TSP results in increased ridership and customer satisfaction
- TSP increases the return on investment in transit vehicle costs
 - Fewer stops result in less wear-and-tear on brakes and transmissions, and lowered fuel consumption*

TSP Theory of Operation

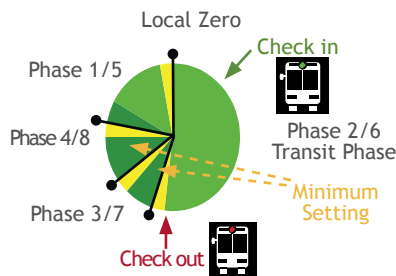
General Operation

- Transit vehicles can use either a “check-in” and “check-out” detection technology, or a continuous input technology.
- If the transit “check-in” and “check-out” both occur within the coordinated movement, there is no modification of the coordination timings.
- Once a TSP has been serviced, the controller will not allow another TSP call for the rest of the current cycle or during the next cycle.
- If TSP does modify the coordination timing, all of the non-transit vehicle phases are serviced during the cycle and none are skipped. The timing for these non-transit phases is programmed by the traffic engineers to minimize or eliminate the effect of TSP on drivers approaching the intersection from other directions.
- If the transit vehicle “check-out” is not detected, or is very late, the coordinator will terminate TSP operation and service the remaining phases in the coordinated cycle in order to return to “Local Zero” in time. The goal is to not skip any phase and to remain in coordination.

Operational Examples

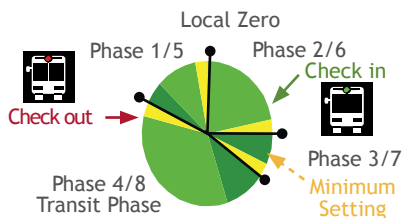
Split Extended by Demand

The transit phase is extended to the “check-out” point, as long as all remaining phases can be serviced prior to “Local Zero.”



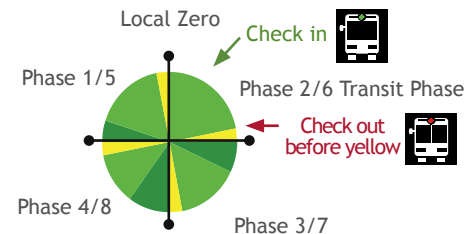
Non-Coordinated Phase Priority

TSP functions similarly to transit phases that are non-coordinated. All phases, except the coordination phases, will be truncated in order to cycle to the transit phase quickly; it then will extend the transit phase to the “check-out” point or until it has to terminate that phase to serve the remaining phases before “Local Zero.”



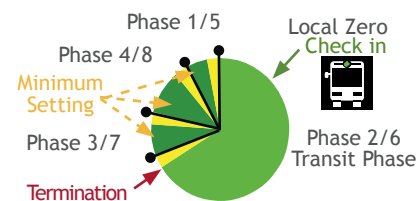
No Modification of Cycle

“Check-in” and “check-out” occur within the transit phase allocated split, regardless of whether it is coordinated or non-coordinated.



No “Check-Out” Termination

TSP will always terminate the transit vehicle phase to prevent skipping any phases in the cycle.



Operation During Free (non-coordinated)

Upon detection of a transit vehicle, all phases will be truncated to the minimum green times in order to get to the transit phase quickly. The transit phase will then time up to the max green time, as long as the TSP input is active.

* APTA Fact Book March 2005 and www.BTS.gov

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